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Bronxx Pty Limited

18 September 2024

Ref: 30N-22-0165-TNT-67874-4

Unit 13, 3 Box Road Caringbah, New South Wales,
2229, Australia

Dear Richard Cridland,

277 The Grand Parade, Ramsgate Beach, NSW

Vipac Engineers and Scientists completed a desktop study and issued a report in July 2022 on the proposed development at 277 The Grand Parade, Ramsgate Beach, NSW (30N-22-0165-TNT-36368-1). Plans of the updated design were supplied in Sep 2024 from CRAFT. A comparison was made with the findings in the July 2022 report. The observations and findings are as follows:

i) The floor plans and arrangements are largely similar in shape and form (Figure 1 to Figure 5); however, the tower has shifted further towards the eastern and northern boundaries such that the tower is now setback 1-2m from the northern and eastern boundaries; This is generally expected to increase corner accelerating winds at the ground level. Given the height of the proposed development, wind levels are not expected to be in excess of the recommended walking comfort criteria.

ii) The ground floor plan has been revised with lobby entry and retail 01 entrance at the north boundary. There is a proposed canopy over these entrances (Figure 1). The entrance to retail 02 has a setback design with a sliding door. The supermarket entry is well setback under the building massing. Front of these entrances are expected to have an acceptable wind environment.

iii) Level 1 features a residential communal open space with a number of outdoor seating areas. However, the communal open space is sheltered by the building from north and east sectors. It is expected to have acceptable wind conditions with the proposed design features and landscaping.

iv) The previous recommendation for level 2 is no longer relevant due to the design changes.

v) The rooftop terrace amenity areas have been removed; as such previous wind control measures for the roof terrace are no longer relevant.

vi) With the reduced number of floors and the heights of floors, the overall height of building is decreased from 28m to 21.1m (Figure 6). These changes, however, are expected to slightly improve the wind conditions compared to the previous design.

Vipac has reviewed the updated drawings and determined that the changes listed above does not adversely affect the wind assessment conclusions carried out in July 2022.

In conclusion, the Sep 2024 design of the proposed development would be expected to generate the similar wind environment to previous design, or even better. However, Vipac recommends wind screens to the ground level outdoor seated areas for the updated plans.

Yours sincerely,

Vipac Engineers & Scientists Ltd

Zhuyun Xu

Principal Wind Engineer

Eric Yuen

Wind Group Leader

Attachments

1) **Figures**

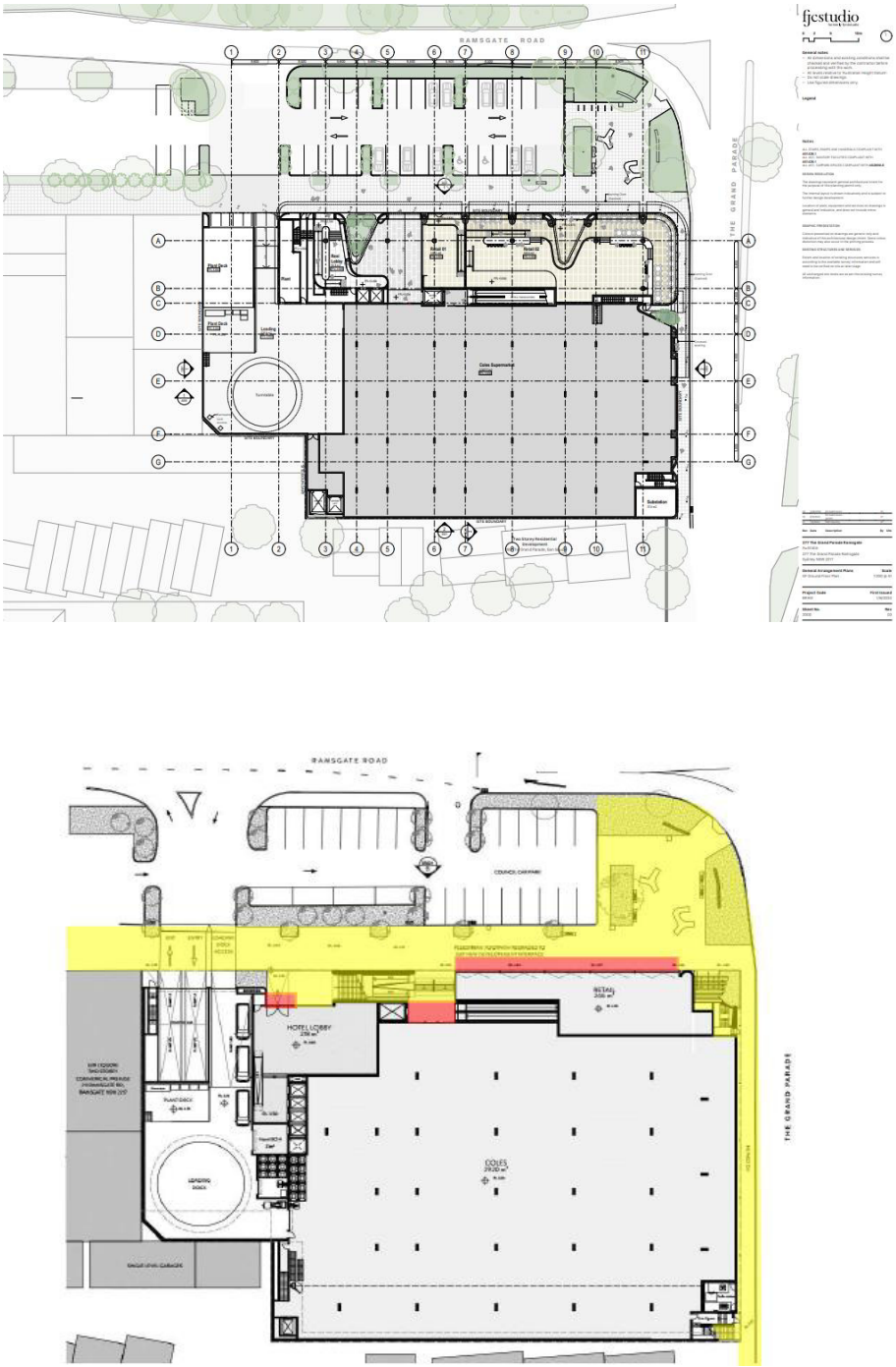

Figure 1: Comparison of the Ground floor plans (Top - updated Sep 2024; Bottom - Design assessed in July 2022)

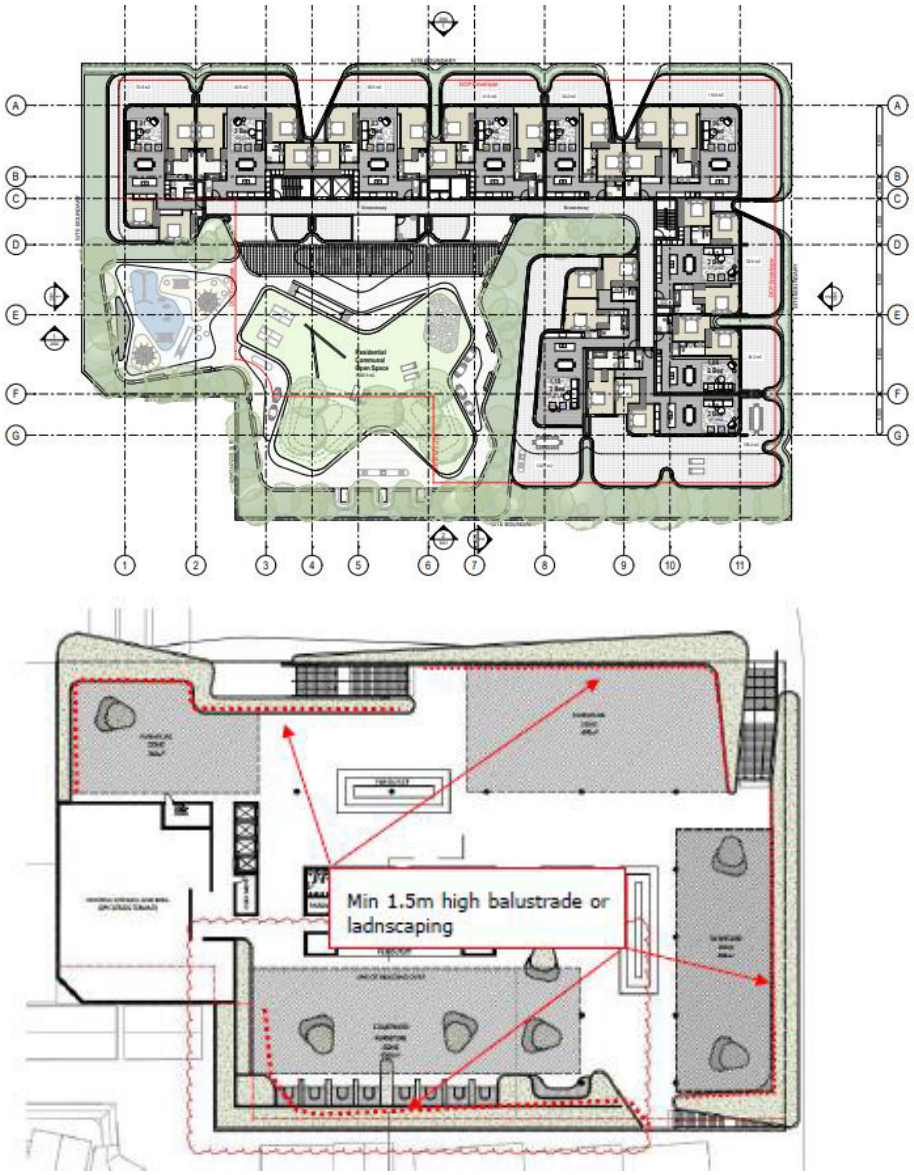

Figure 2: Comparison of the Level 1 plans (Top - updated Sep 2024; Bottom - Design assessed in July 2022)

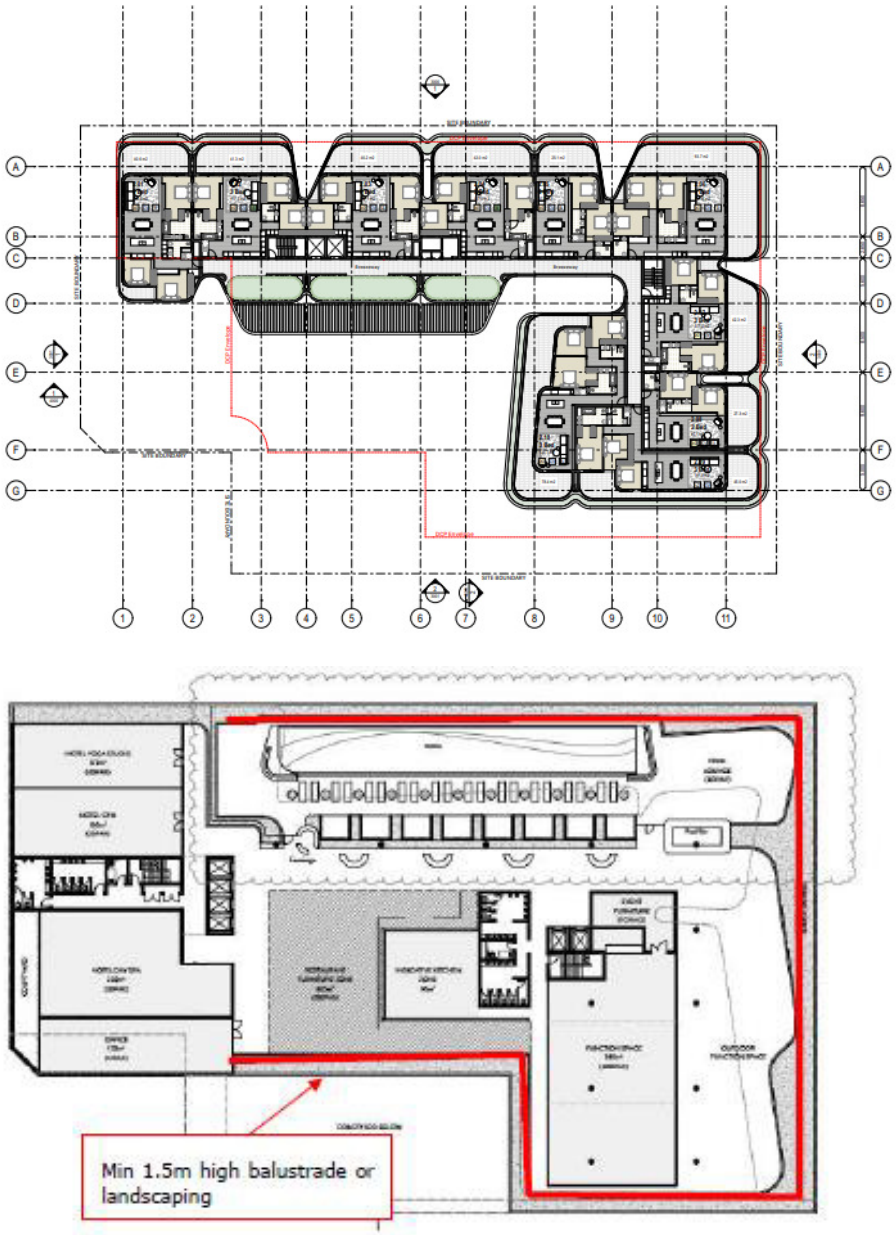

Figure 3: Comparison of the Level 2 plans (Top - updated Sep 2024; Bottom - Design assessed in July 2022)

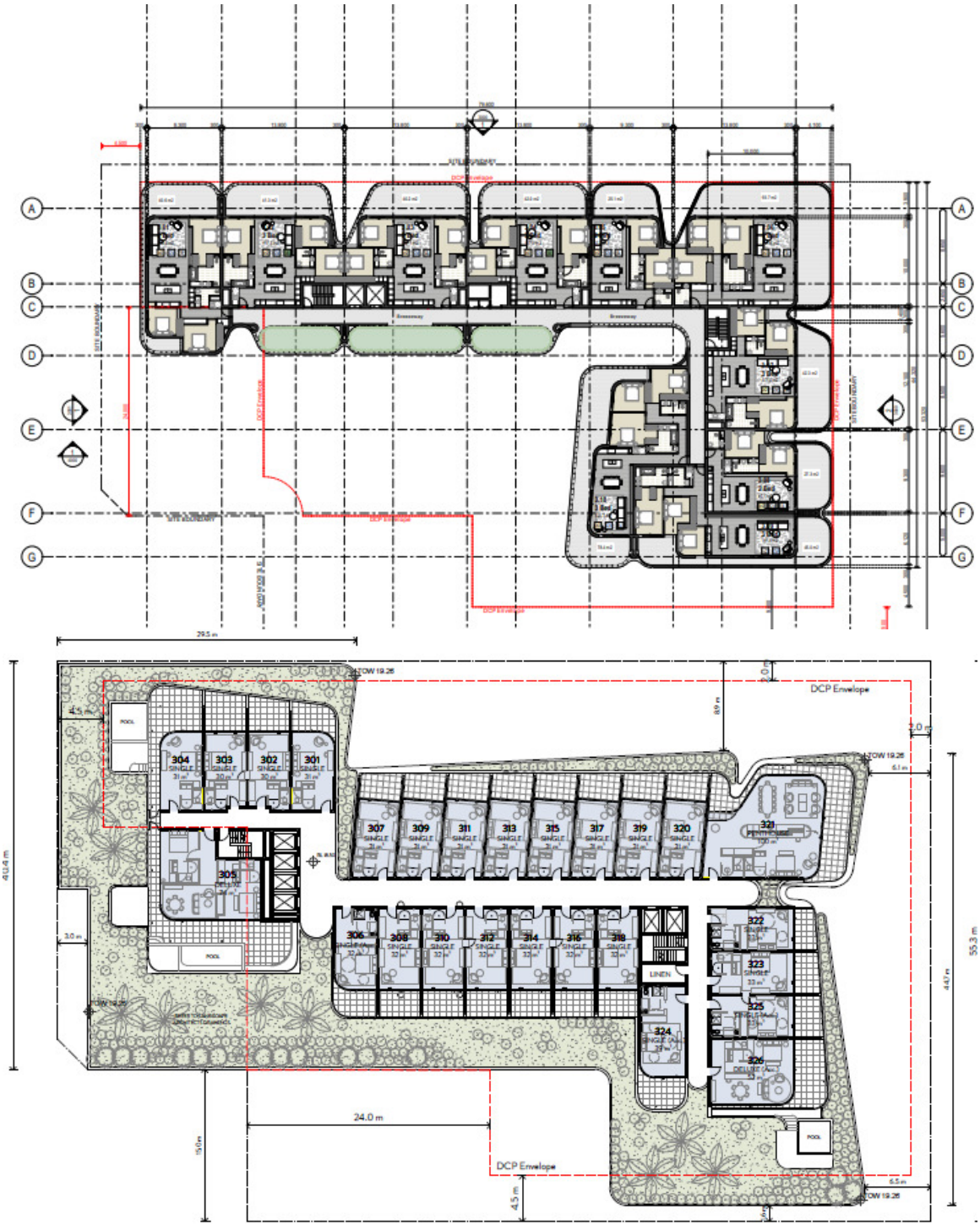

Figure 4: Comparison of typical (Level 3) plans (Top - updated Sep 2024; Bottom - Design assessed in July 2022)

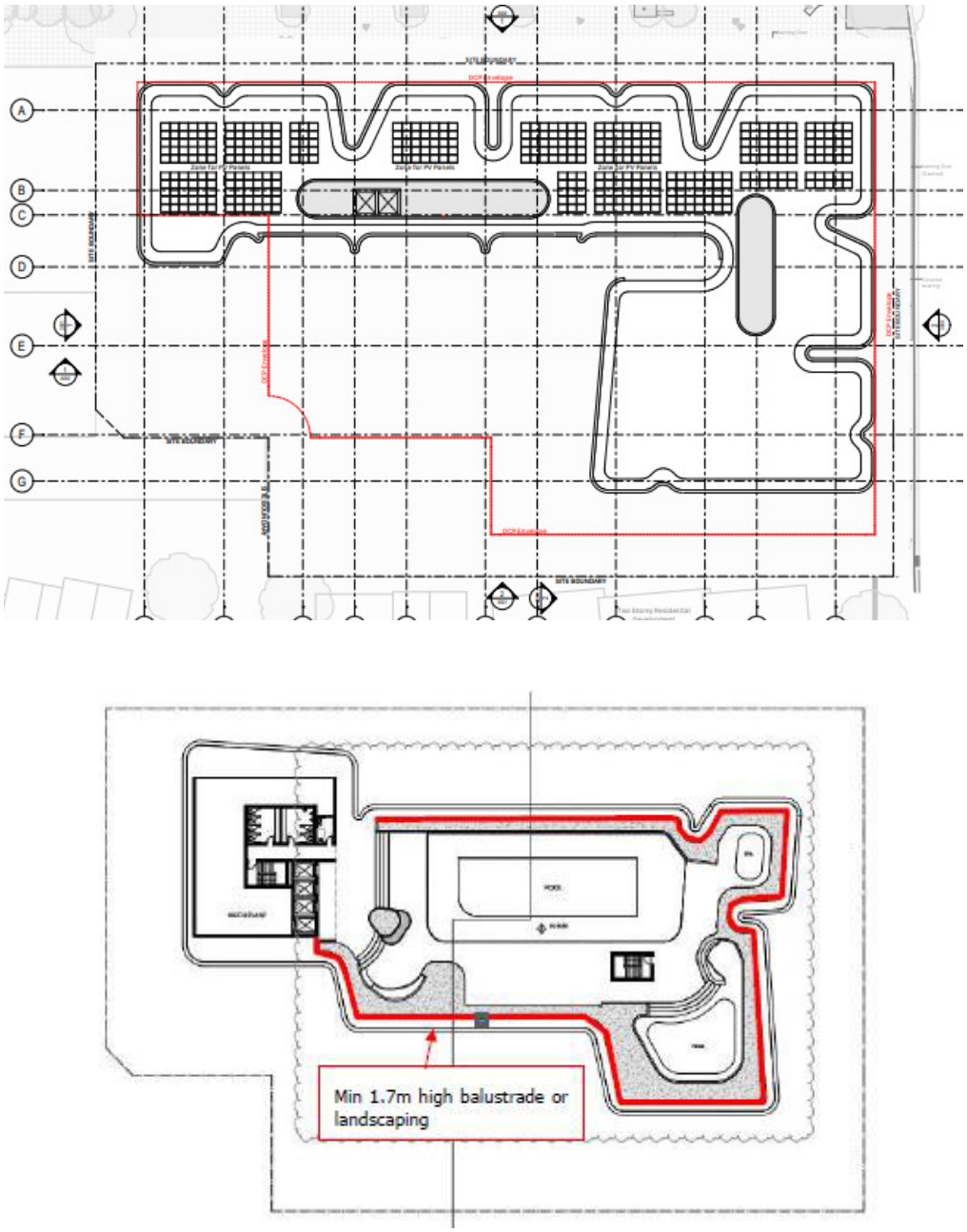

Figure 5: Comparison of the roof top plans (Top - updated Sep 2024; Bottom - Design assessed in July 2022)

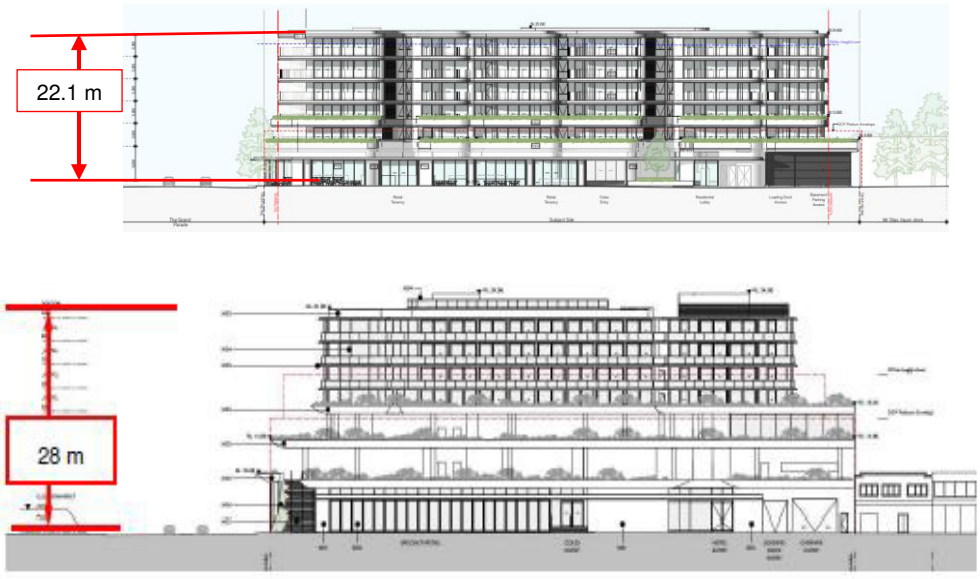

Figure 6: Comparison of the north elevations (Top - updated Sep 2024; Bottom - Design assessed in July 2022)

Attachment 2: *Wind Impact Assessment, July 2022, (30N-22-0165-TNT-36368-1)*

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Bronxx Pty Ltd

277 The Grand Parade, Ramsgate Beach, NSW

Wind Impact Assessment

30N-22-0165-TNT-36368-1

14 July 2022

Job Title:	277 The Grand Parade, Ramsgate Beach, NSW
Report Title:	Wind Impact Assessment
Document Reference:	30N-22-0165-TNT-36368-1

Prepared For:	**Prepared By:**
Bronxx Pty Ltd **Contact:** Richard Cridland **Tel:** 0477368868	Vipac Engineers and Scientists Limited 279 Normanby Rd, Port Melbourne, VIC 3207, Australia **Tel:** +61 3 9647 9700

Author:	Zhuyun Xu 15 Jun 2022	Principal Wind Engineer
Reviewer:	Eric Yuen 14 July 2022	Wind Team Leader
Issued By:	Eric Yuen 14 Jul 2022	Wind Team Leader

Revision History:

Rev. #	*Comments / Details of change(s) made*	*Date*	*Revised by:*
Rev. 00	Original issue	15 Jun 2022	
Rev. 01	Updated Drawings	14 July 2022	E. Yuen

Executive Summary

Bronxx Pty Ltd commissioned Vipac Engineers and Scientists Ltd to prepare a statement of wind effects for the ground level areas adjacent to the proposed development at **277 The Grand Parade,** Ramsgate **Beach, NSW.** This appraisal is based on Vipac's experience as a wind-engineering consultancy.

Drawings of the proposed development were provided by CRAFT in July 2022.

The findings of this study can be summarized as follows:

With proposed design:

- Wind conditions in the ground level footpath areas and access ways would be expected to be within the **walking** comfort criterion.
- Wind conditions in front of entrances would be expected to be within the **standing** comfort criterion;
- **With recommendations**, the open spaces at level 1 to level 3 would be expected to be within the recommended **walking** to Sitting comfort criteria.
- **With recommendations,** the rooftop garden is expected to have wind conditions within the recommended **Walking** comfort criterion.

As a general statement, educating occupants about wind conditions at open terrace/balcony areas during high-wind events and fixing loose, lightweight furniture on the terrace are highly recommended.

The assessments provided in this report have been made based on experience of similar situations in Melbourne and around the world. As with any opinion, it is possible that an assessment of wind effects based on experience and without experimental validation may not account for all complex flow scenarios in the vicinity.

Vipac recommended a wind tunnel test be conducted to quantity the wind conditions and determine the proper wind control measures wherever necessary.

Table of Contents

1 Introduction

Vipac Engineers and Scientists has been commissioned by **Bronxx Pty Ltd** to carry out an appraisal of the pedestrian wind effects at the ground level of the proposed development at **277 The Grand Parade,** Ramsgate **Beach, NSW.**

Strong winds in pedestrian areas are frequently encountered in central business districts of cities around the world; including Sydney, Melbourne and Brisbane. Wind characteristics such as the mean speed, turbulence and ambient temperature determine the extent of disturbance to users of pedestrian areas. These disturbances can cause both comfort and safety problems and require careful consideration to mitigate successfully.

The proposed development is a 7-storey hotel building with a roof height of 28 m from Ground Level. The site is bounded by The Grand Parade to the East, and existing car park to the north and existing developments to the remaining sides. A satellite image of the proposed development site and the northern Elevation of the building are shown in Figure 1 and Figure 2, respectively.

This report details the opinion of Vipac as an experienced wind engineering consultancy regarding the wind effects in ground level footpath areas adjacent to the development as proposed. No wind tunnel testing has been carried out for this development at this stage. Vipac has carried out wind tunnel studies on a large number of developments of similar shape and having similar exposure to that of the proposed development. These serve as a valid reference for the prediction of wind effects. Empirical data for typical buildings in boundary layer flows has also been used to estimate the likely wind conditions on the ground level areas of the proposed development [2] & [3].

Drawings of the proposed development were supplied to Vipac by CRAFT in July 2022. A list of drawings supplied is provided in Appendix C of this report.

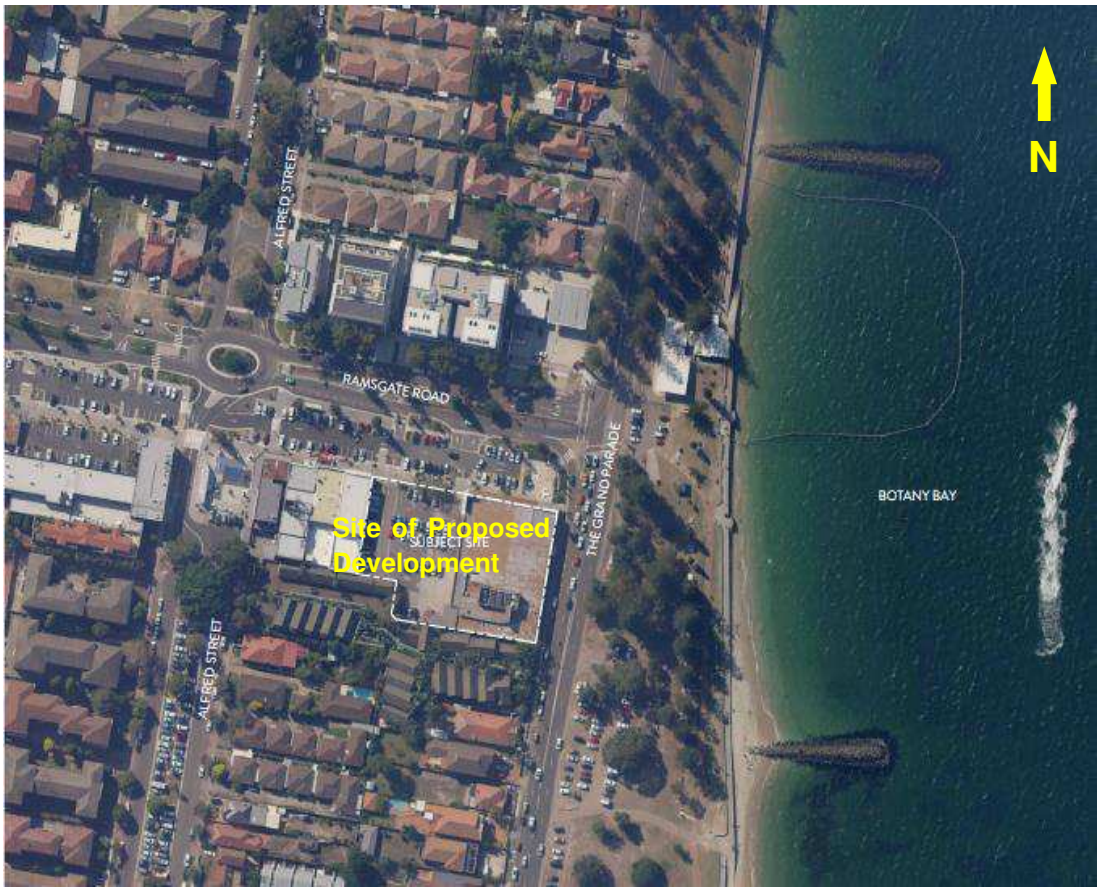


Figure 1: Aerial view of the proposed development site

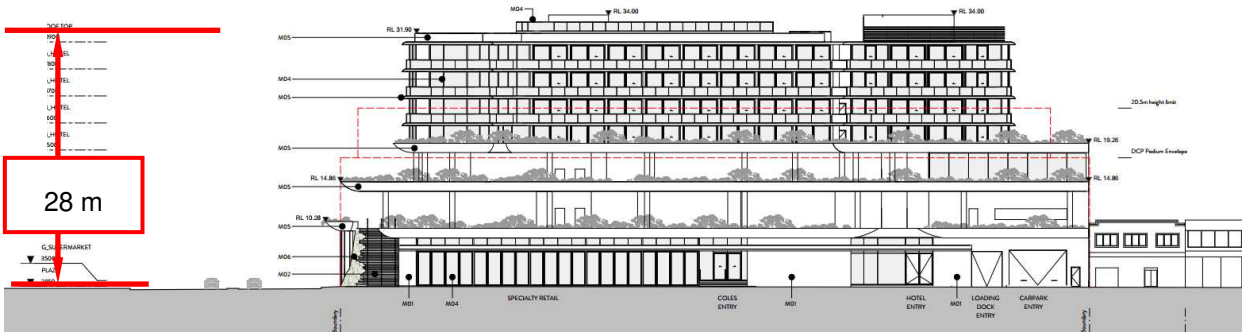


Figure 2: Northern Elevation the proposed development.

2 Analysis Approach

In assessing whether a proposed development is likely to generate adverse wind conditions in ground level footpath areas, Vipac has considered the following five main points:

- The exposure of the proposed development to wind;
- The regional wind climate;
- The geometry and orientation of the proposed development;
- The interaction of flows with adjacent developments; and
- The assessment criteria determined by the intended use of the areas affected by wind flows generated or augmented by the proposed development.

The pedestrian wind comfort at specific locations of ground level footpath areas may be assessed by predicting the gust and mean wind speeds with an annual return period expected at that location. The location may be deemed generally acceptable for its intended use while gust and mean wind speeds are within the threshold values noted in Section 2.5. Where Vipac predicts that a location would not meet its appropriate comfort criterion, the use of wind control devices and/or local building geometry modifications to achieve the desired comfort rating may be recommended. For complex flow scenarios or where predicted flow conditions are well in excess of the recommended criteria, Vipac recommends scale model wind tunnel testing to determine the type and scope of the wind control measures required to achieve acceptable wind conditions.

2.1 Site Exposure

The proposed development is located on a relatively flat terrain. The site is surrounded within an approximately 1.8 km radius predominately by low rise developments from north through west to south; with Botany Bay to the East. A satellite image showing these site surroundings is shown in Figure 3.

Considering the immediate surroundings and terrain, for the purposes of this study, the site of the proposed development is assumed to be within Terrain Category 3 for land surround exposures and Terrain Category 1.5 for the water surround sectors (Figure 3).

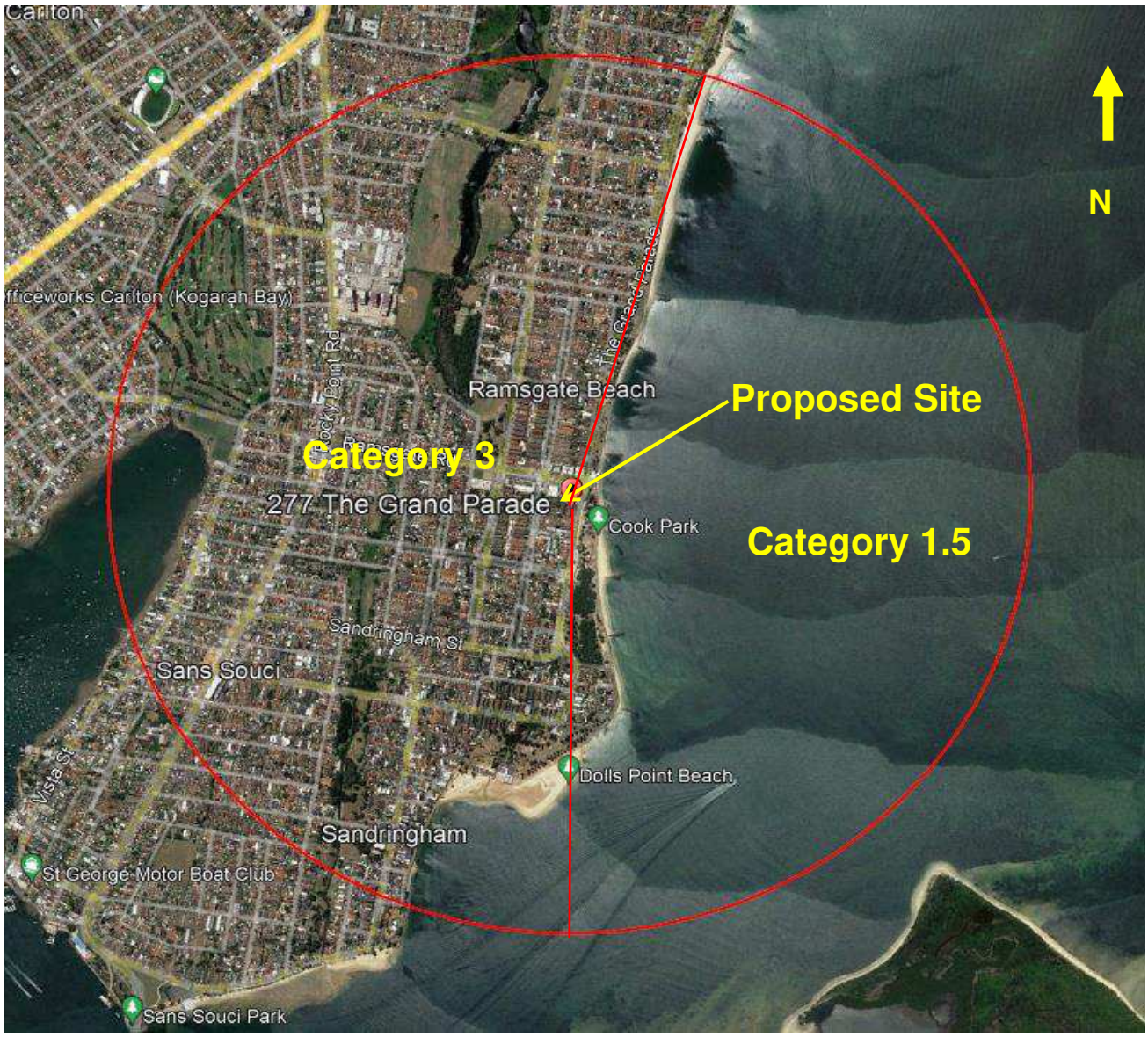


Figure 3: Assumed terrain categories for wind speed estimation.

2.2 Regional Wind Climate

The mean and gust wind speeds have been recorded in the Sydney area for 30 years. These data have been analysed and the directional probability distribution of wind speeds have been determined. The directional distribution of hourly mean wind speed at the gradient height, with a probability of occurring once per year (i.e. 1 year return period) is shown in Figure 4. The wind data at this free stream height are common to all Sydney city sites and may be used as a reference to assess ground level wind conditions at the site. Figure 4 indicates that the stronger winds can be expected from the south to north-westerly directions, followed by south, then North Easterly directions.

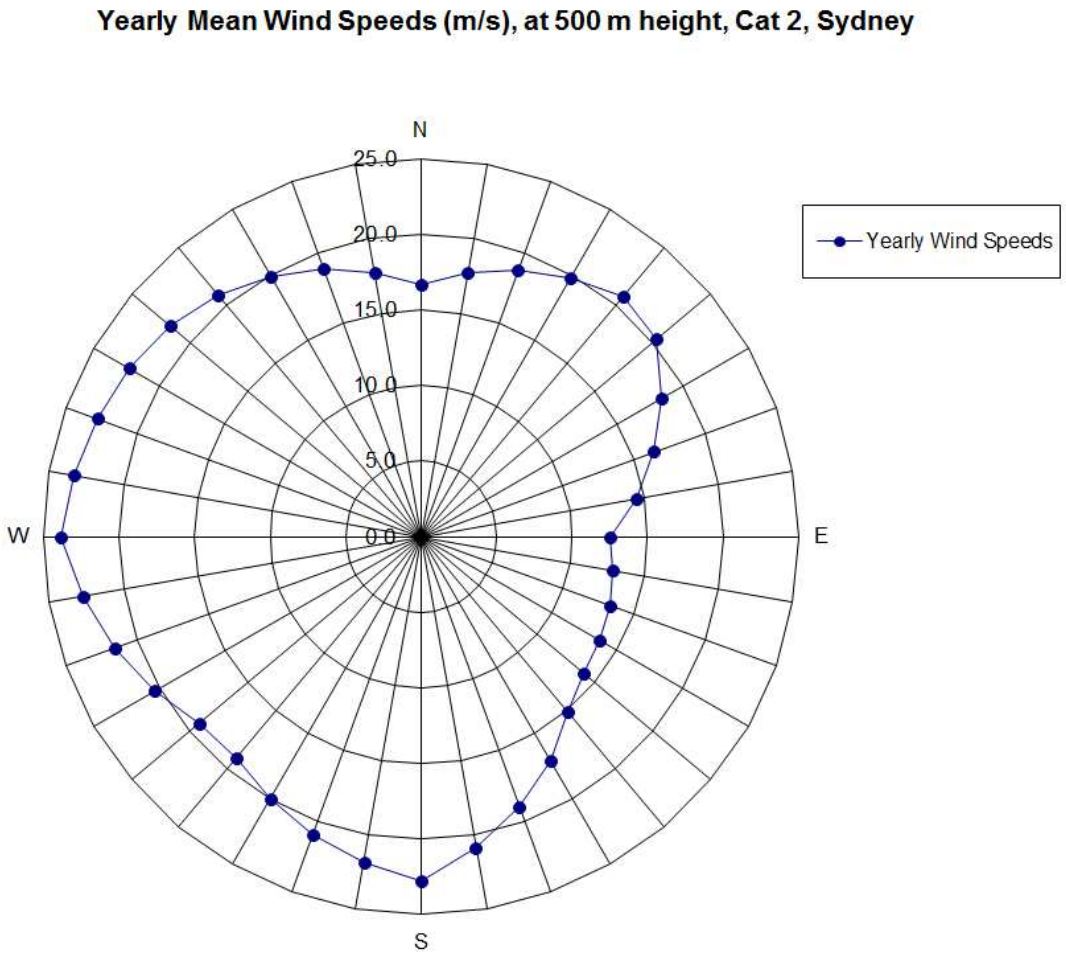


Figure 4: Directional Distribution of Annual Return Period Maximum Mean Hourly Wind Velocities (m/s) at gradient height in Sydney.

2.3 Building Geometry and Orientation

The proposed development is a 7-storey hotel building with retails at the ground level. The overall plan-form dimensions are approximately 55.3 m x 86.1 m as shown in Figure 5. The main entrances are located at the north. The development incorporates setbacks from all surrounding boundaries from level 3 to the top. A rooftop garden is proposed.

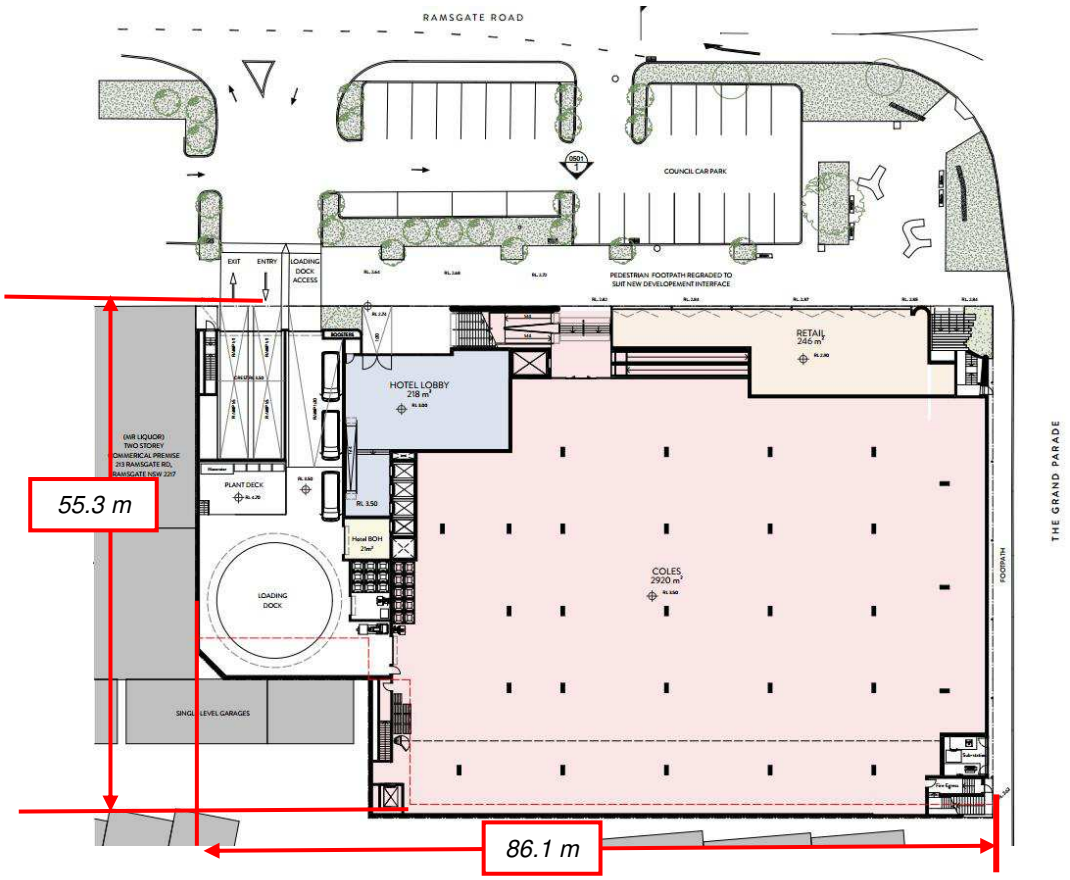


Figure 5: Ground floor plans with the plan-form dimensions overlaid.

2.4 Flow interactions with Adjacent Developments

The immediately adjacent developments are shown in Figure 6. At ground level, the site is exposed to direct winds from the northerly directions along The Grand Parade and westerly winds along Ramsgate Rd as well as easterly winds from botany bay. The building is oriented such that adverse impacts from corner acceleration of easterly and northerly winds is expected at north east corner of the building. The development is taller than the surrounding buildings from most directions and is exposed to winds at the upper levels, particularly at the rooftop garden.

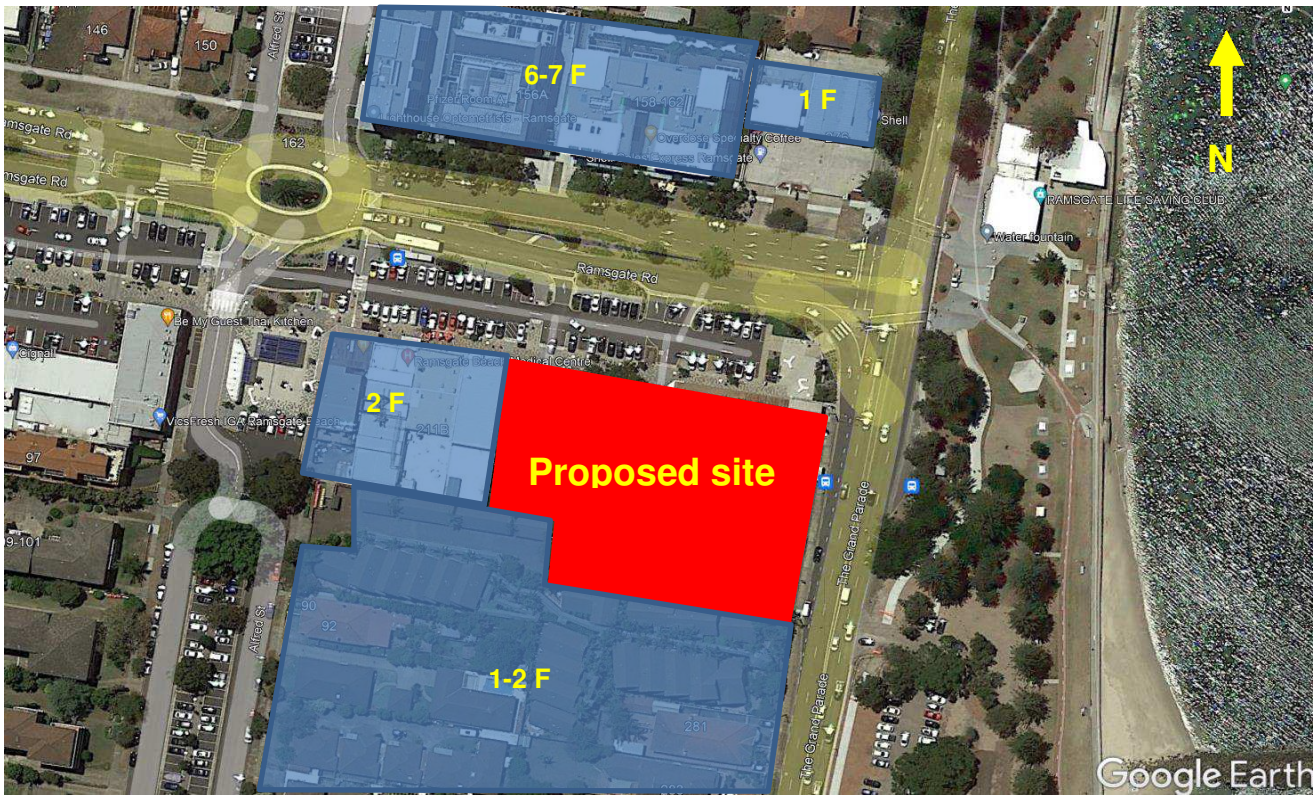


Figure 6: Immediately adjacent surroundings and their approximate number of floors (F)

2.5 Assessment Criteria

With some consensus of international opinion, pedestrian wind comfort is rated according to the suitability of certain activities at a site in relation to the expected annual peak 3-second gust velocity at that location for each wind direction. Each of the major areas around the site are characterized by the annual maximum gust wind speeds. Most patrons would consider a site generally unacceptable for its intended use if it were probable that during one annual wind event, a peak 3-second gust occurs which exceeds the established comfort threshold velocity (shown in Table 1). If that threshold is exceeded once per year then it is also likely that during moderate winds, noticeably unpleasant wind conditions would result, and the windiness of the location would be considered as unacceptable.

Table 1: Recommended Wind Comfort and Safety Gust Criteria

Annual Maximum Gust Speed	Result on Perceived Pedestrian Comfort
>23m/s	Unsafe (frail pedestrians knocked over)
<20m/s	Acceptable for **fast walking** (waterfront or particular walking areas)
<16m/s	Acceptable for **walking** (steady steps for most pedestrians)
<13m/s	Acceptable for **standing** (window shopping, vehicle drop off, queuing)
<11m/s	Acceptable for **sitting** (outdoor cafés, gardens, park benches)

In a similar manner, a set of hourly mean velocity criteria (see Table 2) with a 0.1% probability of occurrence are also applicable to ground level areas in and adjacent to the proposed development. An area should be within both the relevant mean and gust limits in order to satisfy the particular human comfort and safety criteria in question.

Table 2: Recommended Wind Comfort and Safety Mean Criteria

Mean Speed in 0.1% of Time	Result on Perceived Pedestrian Comfort
>15m/s	Unsafe (frail pedestrians knocked over)
<13m/s	Acceptable for **fast walking** (waterfront or particular walking areas)
<10m/s	Acceptable for **walking** (steady steps for most pedestrians)
<7m/s	Acceptable for **standing** (window shopping, vehicle drop off, queuing)
<5m/s	Acceptable for **sitting** (outdoor cafés, gardens, park benches)

The Beaufort Scale is an empirical measure that related the wind speed to observed conditions on the land and sea. Table 3 describes the categories of the Beaufort Scale. The comparison between these observed conditions and the comfort criteria described above can be found in Table 4.

Table 3: Beaufort Scale - empirical measure relating wind speed to observed conditions on land

Beaufort Number	**Descriptive Term**	**Wind Speed at 1.75 m height (m/s)**	**Specification for Estimating Speed**
0	Calm	0-0.1	
1	Light Air	0.1-1.0	No noticeable wind
2	Light Breeze	1.1-2.3	Wind felt on face
3	Gentle Breeze	2.4-3.8	Hair disturbed, clothing flaps, newspapers difficult to read
4	Moderate Breeze	3.9-5.5	Raises dust and loose paper; hair disarranged
5	Fresh Breeze	5.6-7.5	Force of wind felt on body, danger of stumbling when entering a windy zone
6	Strong Breeze	7.6-9.7	Umbrellas used with difficulty, hair blown straight, difficult to walk steadily, sideways wind force about equal to forwards wind force, wind noise on ears unpleasant
7	Near Gale	9.8-12.0	Inconvenience felt when walking
8	Gale	12.1-14.5	Generally impedes progress, great difficulty with balance in gusts
9	Strong Gale	14.6-17.1	People blown over

Table 4: Comparison between Mean comfort criteria and the observed conditions

Comfort Criteria	**Beaufort Scale Equivalent**
Safety	9 – Strong Gale
Walking	5 – Fresh Breeze
Standing	4-5 – Moderate to Fresh Breeze
Sitting	<4 – Moderate Breeze

2.5.1 Use of Adjacent Pedestrian Occupied Areas & Recommended Comfort Criteria

The following table lists the specific areas adjacent to the proposed development and the corresponding recommended criteria.

Table 5: Recommended application of criteria

Area	Specific location	Recommended Criteria
Public Footpaths, Access ways	Along Grand Parada, the adjacent walkway and footpath (Figure 7)	Walking
Building Entrances	Main Building Entrances at north walkway (Figure 7)	Standing
Outdoor Communal Areas	Located on level 1, level 2 and level 3 (Figure 8 to Figure 10)	Walking to Sitting
Rooftop Garden/Terraces	communal garden on rooftop (Figure 11)	Walking (See discussion below)

2.5.2 Terrace / Balcony Recommended Criterion Discussion

There are Private Balconies and Terraces located up the height of the development. Vipac recommends as a minimum that balcony/terrace areas meet the criterion for walking since:

- these areas are not public spaces;
- the use of these areas is optional, and only intended to be used on fair weather days with calm winds;
- many similar developments in Sydney and other Australian capital cities experience wind conditions on balconies and elevated deck areas in the vicinity of the criterion for walking.

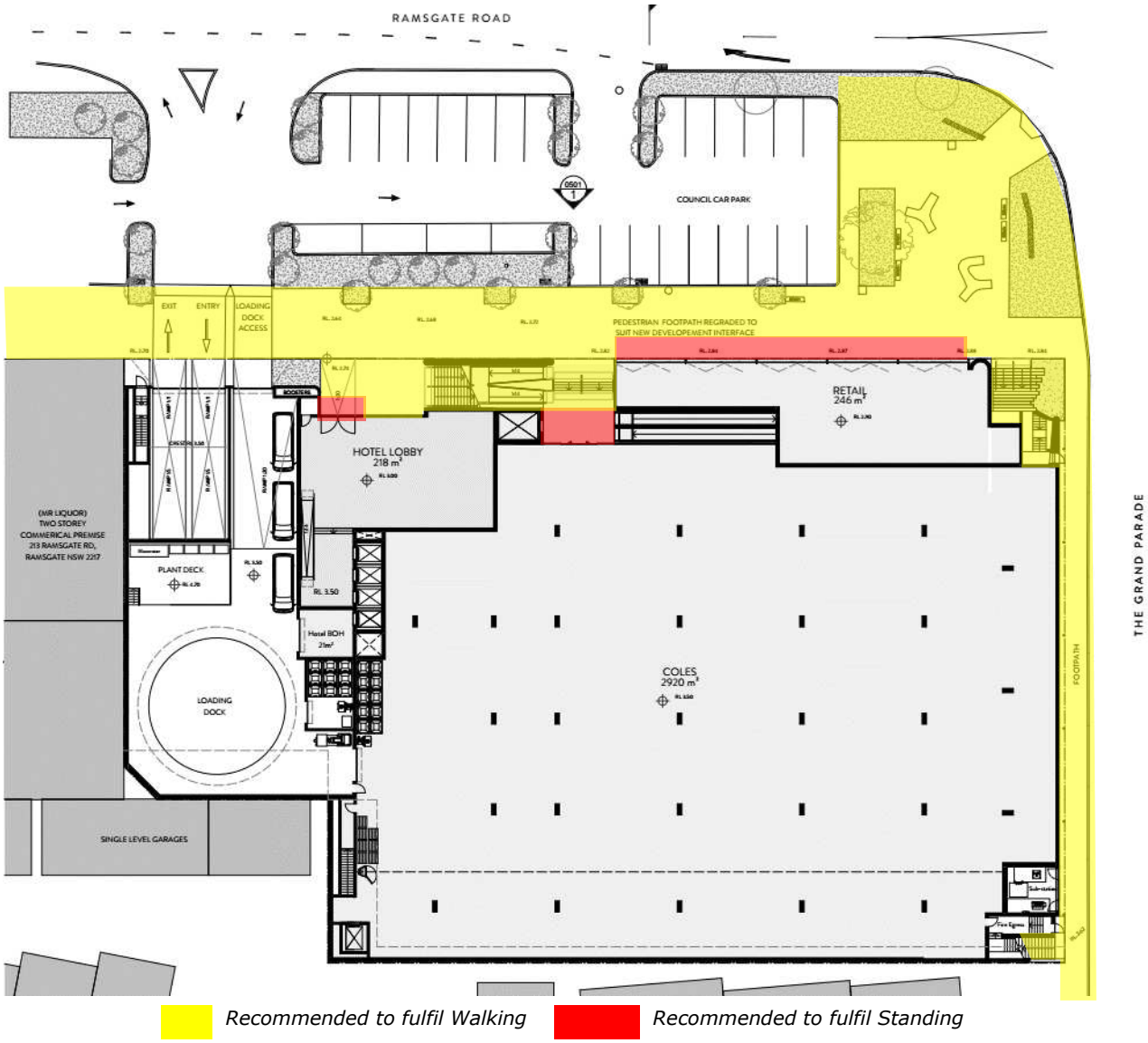


Figure 7: Ground floor with recommended wind criteria overlaid

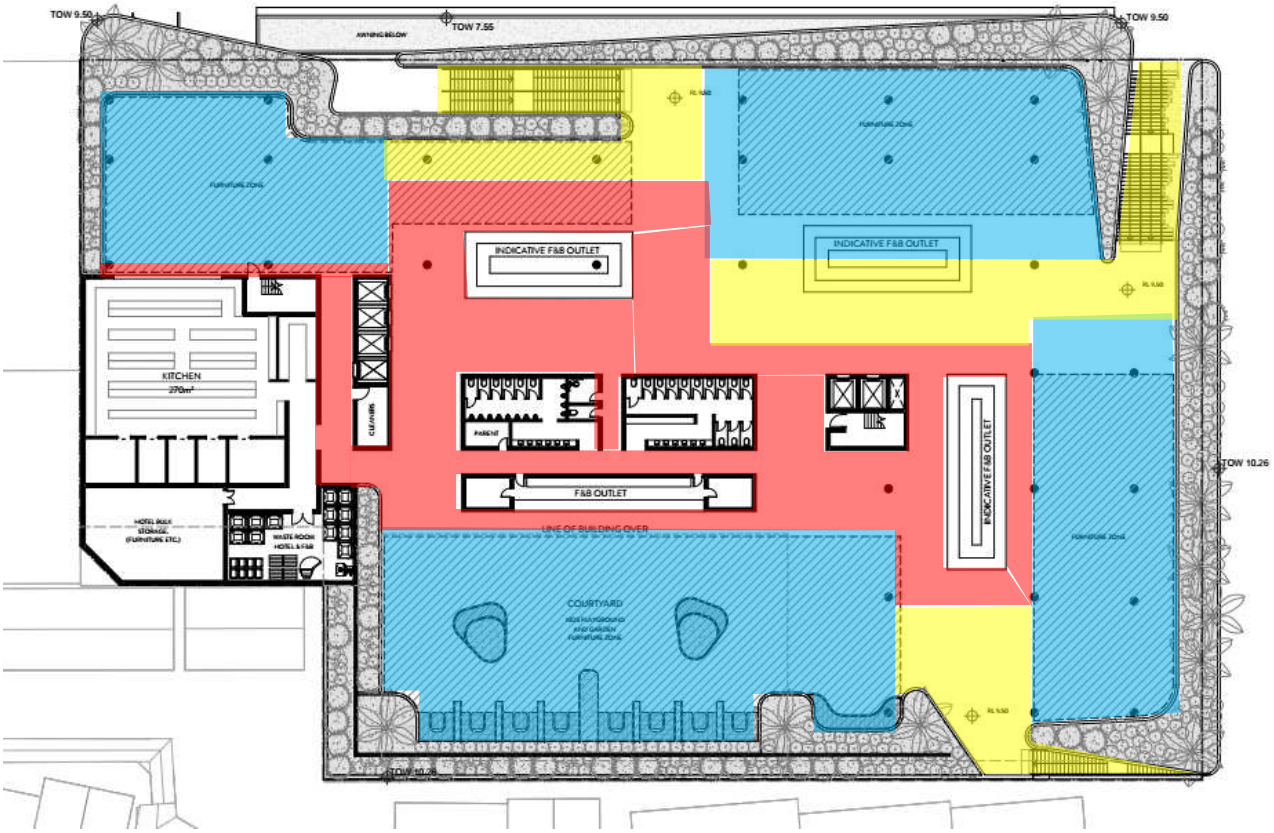
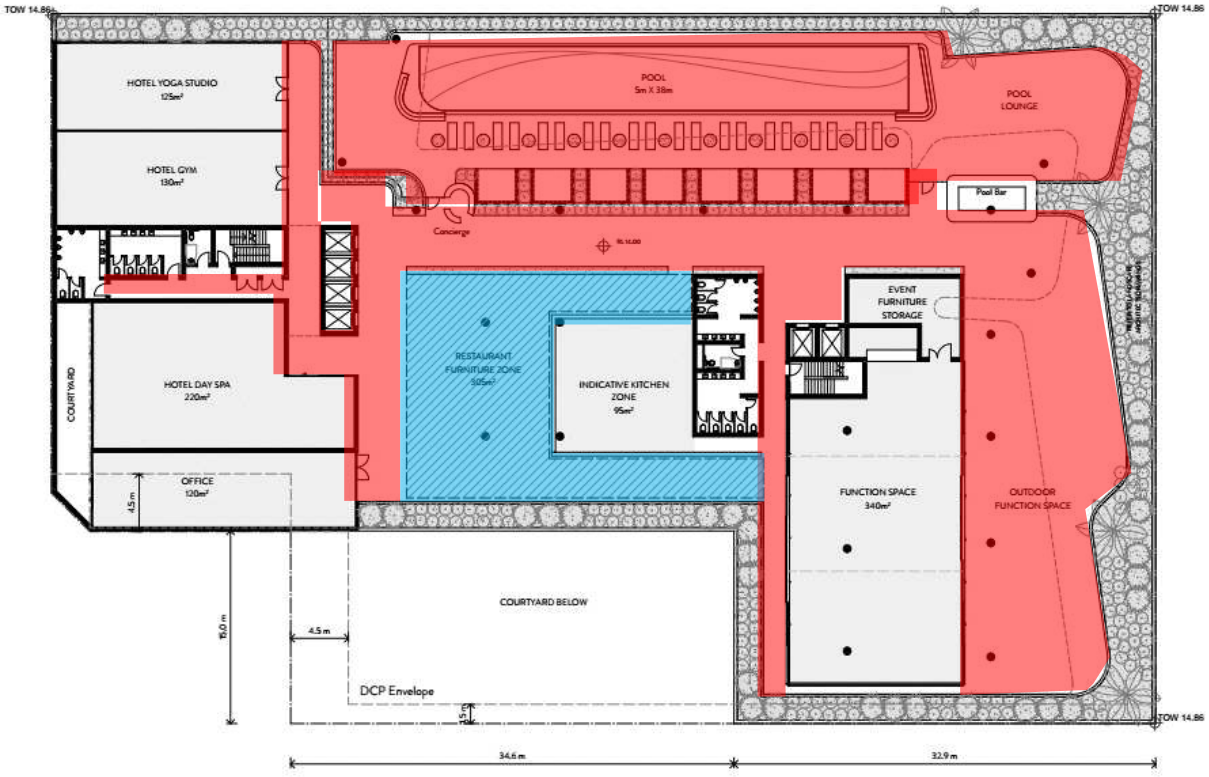
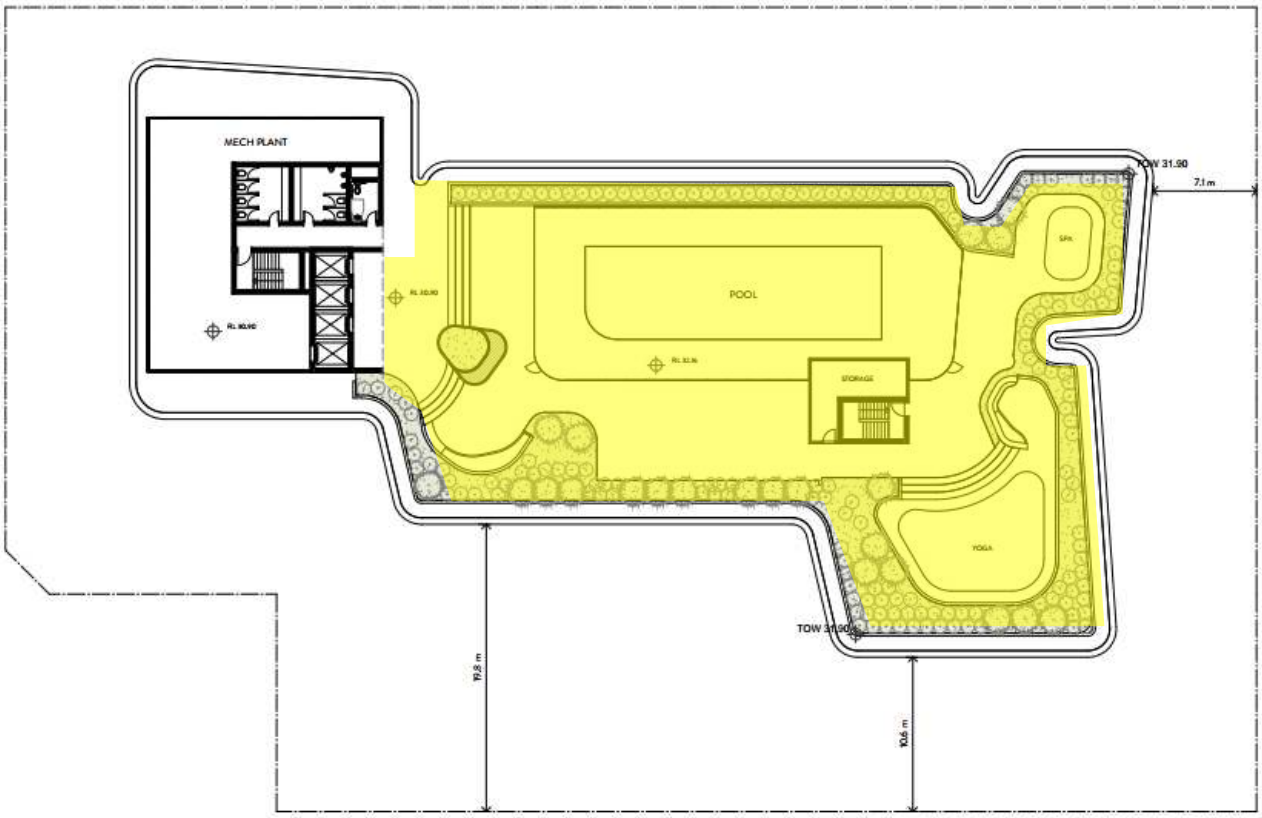


Figure 8: Level 1 plan with recommended wind criteria overlaid



Recommended to fulfil Standing *Recommended to fulfil Sitting*

Figure 9: Level 2 plan with recommended wind criteria overlaid



Recommended to fulfil Walking

Figure 11: Rooftop plan with recommended wind criteria overlaid

3 Pedestrian Level Wind Effects

3.1 Discussion & Recommendations

The proposed design has a number of features that are expected to be beneficial to the pedestrian wind environment. This is inclusive but not limited to the following:

- Upper levels setback from boundaries;
- Round tower corners;
- Open spaces at Level 1 to level 2;

Ground level

Due to the proposed height above the surrounding areas, the proposed development is particularly exposed to adverse westerly winds. However, the proposed open spaces from level 1 to level 2 allow the high down wash winds from façade to be released through these open levels and to reduce the wind speeds at the ground level. The proposed development has a setback tower design from level 3 upwards. As such the surrounding pedestrian areas at ground level are expected to be within the recommended walking comfort criterion or similar to the existing conditions.

The main entrances are located along north streetscape and have setbacks from the boundary, as such these entrances are expected to be within the recommended standing comfort criterion.

Level 1

Plaza spaces are proposed at the level 1 which feature food and beverage outlets and dining spaces in north, east and south. Most of these spaces are recommended sitting wind environment. It is recommended that, as a minimum, 1.5 m high windscreens at the outer perimeter of the seated areas are required (Figure 12). Or as an alternative, the proposed landscaping along the marked locations, should be in the similar height. This could be a 1m high fixed planter with 0.5m high vegetation. More wind control measures like localized wind breaks might be needed which could be determine via a wind tunnel test.

Level 2

Similar to Level 1, the outdoor dining space, function space and pool and pool deck are proposed at level 2. Most of these spaces are recommended standing or sitting wind environment. We recommended that, as a minimum, 1.5 m high windscreens at the outer perimeter of these areas are necessary (Figure 13). Or as an alternative, the proposed landscaping along the marked locations, should be in the similar height. This could be a 1m high fixed planter with 0.5m high vegetation. More wind control measures like localized wind breaks might be needed which could be determine via a wind tunnel test.

Rooftop Garden

The rooftop garden might experience high wind conditions due to the height and exposures. We recommended that, as a minimum, 1.7 m high windscreens/balustrade at the outer perimeter of the garden are necessary or the proposed landscaping should have a similar height (Figure 15). More wind control measures might be needed which could be determine via a wind tunnel test.

It should be noted that this study is based on experience only and has not utilised any experimental data for the analysis.

Vipac recommended a wind tunnel test be conducted to quantity the wind conditions and determine the proper wind control measures wherever necessary.

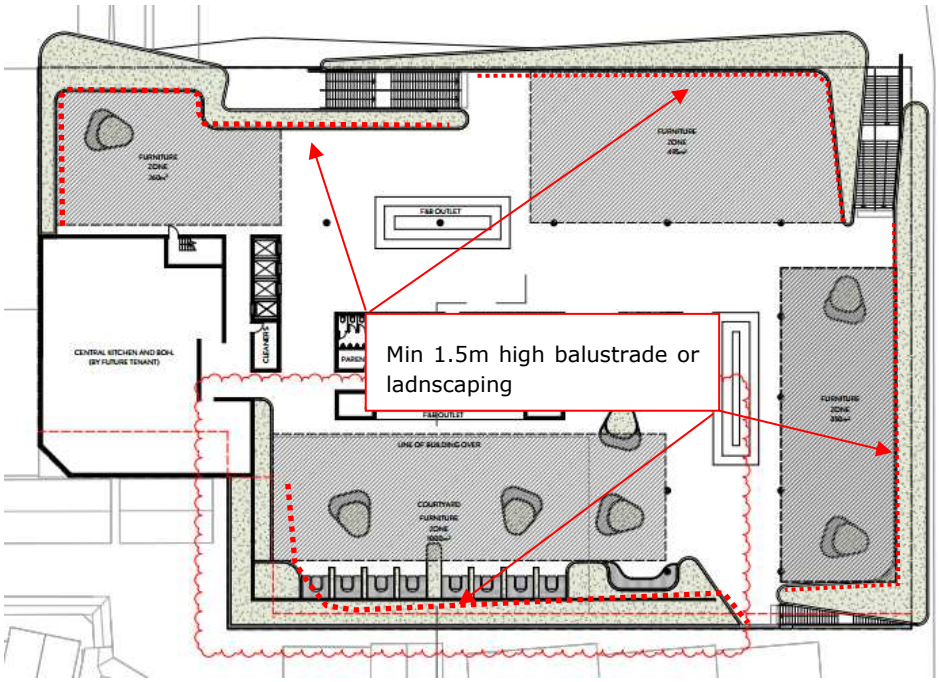


Figure 12: Level 1 plan with the recommended wind control measures overlaid

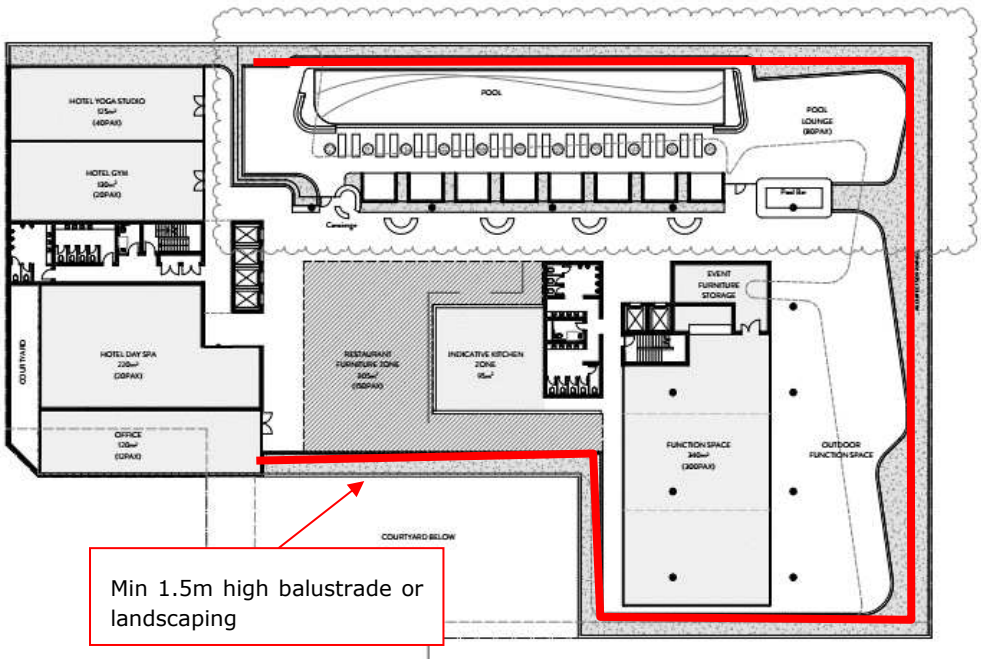


Figure 13: Level 2 plan with the recommended wind control measures overlaid

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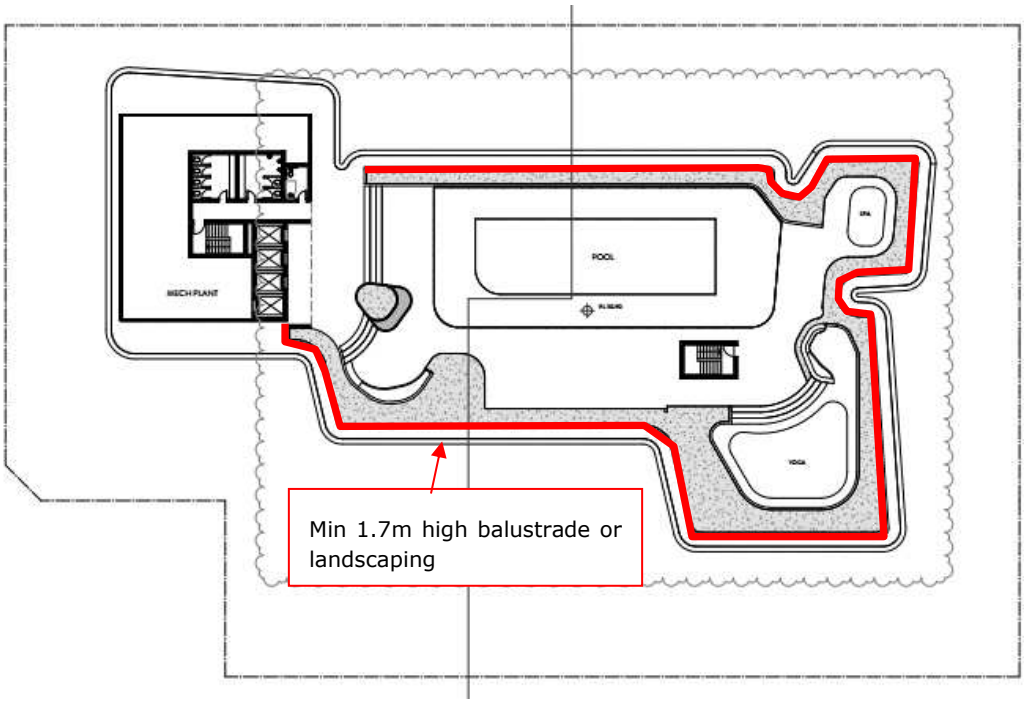


Figure 15: Roof plan with the recommended wind control measures overlaid

Conclusions

An appraisal of the likely wind conditions at the pedestrian ground level and terrace areas of the proposed development at **277 The Grand Parade,** Ramsgate **Beach, NSW** has been made.

Vipac has carefully considered the form and exposure of the proposed development, nominated criteria for various public areas according to their function and referred to past experience to produce our opinion of likely wind conditions.

The findings of this study can be summarised as follows:

With proposed design:

- Wind conditions in the ground level footpath areas and access ways would be expected to be within the **walking** comfort criterion.
- Wind conditions in front of entrances would be expected to be within the **standing** comfort criterion;
- **With recommendations**, the open spaces at level 1 to level 2 would be expected to be within the recommended **walking** to **sitting** comfort criteria.
- **With recommendations,** the rooftop garden is expected to have wind conditions within the recommended **Walking** comfort criterion.

As a general statement, educating occupants about wind conditions at open terrace/balcony areas during high-wind events and fixing loose, lightweight furniture on the terrace are highly recommended.

The assessments provided in this report have been made based on experience of similar situations in Melbourne and around the world. As with any opinion, it is possible that an assessment of wind effects based on experience and without experimental validation may not account for all complex flow scenarios in the vicinity.

Vipac recommended a wind tunnel test be conducted to quantity the wind conditions and determine the proper wind control measures wherever necessary.

This Report has been Prepared

For

Bronxx Pty Ltd

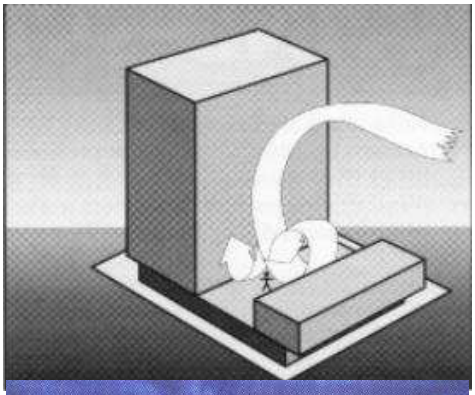
By

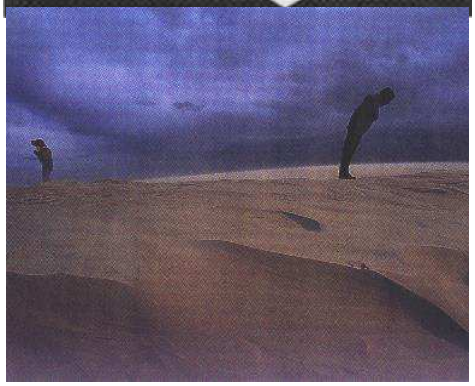
VIPAC ENGINEERS & SCIENTISTS PTY LTD.

Appendix A Environmental Wind Effects

Atmospheric Boundary Layer

As wind flows over the earth it encounters various roughness elements and terrain such as water, forests, houses and buildings. To varying degrees, these elements reduce the mean wind speed at low elevations and increase air turbulence. The wind above these obstructions travels with unattenuated velocity, driven by atmospheric pressure gradients. The resultant increase in wind speed with height above ground is known as a wind velocity profile. When this wind profile encounters a tall building, some of the fast-moving wind at upper elevations is diverted down to ground level resulting in local adverse wind effects.





The terminology used to describe the wind flow patterns around the proposed development is based on the aerodynamic mechanism, direction and nature of the wind flow.

Downwash – refers to a flow of air down the exposed face of a tower. A tall tower can deflect a fast-moving wind at higher elevations downwards.

Corner Accelerations – when wind flows around the corner of a building it tends to accelerate in a similar manner to airflow over the top of an aeroplane wing.

Flow separation – when wind flowing along a surface suddenly detaches from that surface and the resultant energy dissipation produces increased turbulence in the flow. Flow separation at a building corner or at a solid screen can result in gusty conditions.

Flow channelling – the well-known "street canyon" effect occurs when a large volume of air is funnelled through a constricted pathway. To maintain flow continuity the wind must speed up as it passes through the constriction. Examples of this might occur between two towers, in a narrowing street or under a bridge.

Direct Exposure – a location with little upstream shielding for a wind direction of interest. The location will be exposed to the unabated mean wind and gust velocity. Piers and open water frontage may have such exposure.

Appendix B References

[1] *Structural Design Actions, Part 2: Wind Actions*, Australian/New Zealand Standard 1170.2:2011

[2] *Wind Effects on Structures* E. Simiu, R Scanlan, Publisher: Wiley-Interscience

[3] *Architectural Aerodynamics* R. Aynsley, W. Melbourne, B. Vickery, Publisher: Applied Science Publishers

Appendix C Drawings List

Drawings Received: **July, 2022**

0000 PRELIM
0001 COVER PAGE 7 13/07/2022
0100 OVERALL PLANS
0101 SITE PLAN 8 13/07/2022
0103 DEMOLITION PLAN 1 13/07/2022
0200 FLOOR PLANS
0201 FLOOR PLAN B2 9 13/07/2022
0202 FLOOR PLAN B1 14 13/07/2022
0203 FLOOR PLAN G 13 13/07/2022
0204 FLOOR PLAN L1 9 13/07/2022
0205 FLOOR PLAN L2 8 13/07/2022
0206 FLOOR PLAN L3 9 13/07/2022
0207 FLOOR PLAN L4 10 13/07/2022
0208 FLOOR PLAN L5 8 13/07/2022
0209 FLOOR PLAN L6 8 13/07/2022
0210 ROOF PLAN 6 13/07/2022
9000 BASEMENT 01 - VPA OPTION 1 13/07/2022
9001 BASEMENT 02 - VPA OPTION 1 13/07/2022
0500 ELEVATIONS
0501 ELEVATIONS SHEET 2 8 13/07/2022
0502 ELEVATIONS SHEET 3 8 13/07/2022
0600 SECTIONS
0601 SECTIONS SHEET 1 8 13/07/2022